SECTION 14A

WATER DISTRIBUTION SYSTEMS

BASIS FOR DESIGN:

Design shall conform to the requirements as set forth in "Minimum Standards for Public Water" (latest version) as published by the Georgia Environmental Protection Division (www.dnr.state.ga.us/dnr). A Professional Engineer registered in the State of Georgia must prepare the plans and specifications.

There shall be no physical connection between a potable water supply and a questionable water supply which would allow unsafe (contaminated) water to enter the potable water system by direct pressure, vacuum, gravity or any other means.

Hydraulic designs shall be based upon pressure data applicable to the portion of the service area, which will serve the proposed facility. Air release valves in vaults shall be provided at all high points in the water main as required by the Utilities Director.

All water distribution systems shall be looped to the greatest extent possible. Water mains shall have a minimum nominal inside diameter of 8 inches. 6-inch mains will be allowed in single-family residential subdivisions where the system is looped. Water mains having an inside diameter of less than 6 inches will not normally be considered.

During construction when deviations from approved plans are desired, the Augusta Utilities

Department’s Inspector shall be notified. Revised plans shall be submitted as soon as possible to the Augusta Utilities Department for approval. Minor changes not affecting capacities, flows or operation may be allowed in the field during construction by the Utilities Department’s Inspector. The Inspector shall have final authority as to what constitutes a minor or major change. An approved set of Record Drawings clearly showing any changes shall be submitted to the Augusta Utilities Department Inspector at the completion of the work and prior to sign-off of the final plat.

The Contractor/Developer is responsible for verifying the exact location, size and material of any existing water facility proposed for connection or use by the project.

All phases of construction must be completed in accordance with the Erosion and Sedimentation Act 12-7-1 et seq., and no water main must be installed on or in close proximity of an abandoned landfill site or any site used for waste disposal.

All work that occurs in the public right-of-way shall comply with the Augusta-Richmond County Planning Commission "Development Documents" (latest version) and Public Works Department’s Right-of-Way Encroachment Guidelines (latest version). Any field changes that occur in the public right-of-way and are not specifically related to water or sewer items shall be coordinated with the Public Works Department.

DESIGN STANDARDS FOR WATER MAINS:

1. **Cover**

    1. Standard depth of cover is 4 feet below existing and proposed road surface (and areas designed for normal traffic loading) unless otherwise approved

by the Augusta Utilities Department.

2. Minimum cover to finished grade over water mains shall be 36 inches. Minimum cover under ditch bottoms shall be 24 inches. These must be approved by the Augusta Utilities Department on a case-by-case basis.

2. **Horizontal Separation**

1. Ten (10) feet to any existing or proposed sanitary sewer/force main, storm sewer or sewer manhole (less than 10 feet requires pipe material to be Ductile Iron Pipe (DIP) for both Water Main and Sewer/Force Main).

2. Fifteen (15) feet to buildings, top of bank of lakes/streams/creeks, other structures (10 feet absolute minimum – only when unavoidable, and pipe material is required to be DIP).

3. Ten (10) feet minimum separation to gas mains.

4. Ten (10) feet minimum to underground electric cable.

5. Current Georgia EPD separation requirements.

6. All separation distances above are edge to edge.

3. **Vertical Separation**

    1. Water main shall cross over other pipes.

    2. Eighteen (18) inch minimum separation (edge to edge) between all pipes and cables shall be maintained (6 inch absolute minimum separation with DIP) when conforming to Georgia EPD separation requirements.

    3. When water mains cross under sewers, additional measures shall be taken. At least 18 inches of separation between the bottom of the sewer and the top of the water main shall be provided. Adequate structural support for the sewer to prevent deflection or settling on the water main. The joint of water pipe shall be centered at the crossing. Encasement of the water pipe in concrete shall also be considered.

4. **Layout**

    1. Normal location of proposed water lines is on the north side of east-west streets, and the east side of north-south streets.

    2. For existing County roads, the proposed water line will generally be located five (5) feet inside the right-of-way. For existing State roads, the proposed water line must be located five (5) feet inside the right-of-way. Unusual circumstances may warrant deviation. The location of the water line will be determined, also, by the location of the existing lines to be tied into at the beginning and end of the project.

3. For subdivisions, the proposed water line shall be located four (4) feet from the back of the curb. Where ditches are present beside the curb, refer to the Right-of-Way Encroachment Guidelines (latest version) published by the Public Works Department.

4. Wherever possible, avoid laying water line on the same side of the road as the gas lines.

5. Water service lines for residential development shall be located at the center of lot.

6. Dead ends shall be minimized by making appropriate tie-ins whenever practical. Permanent dead ends will not be accepted unless unavoidable. Dead ends shall be equipped with a fire hydrant. If, under special circumstances, where water lines smaller than six (6) inches in diameter are accepted, an approved blowoff shall be required for flushing purposes. A minimum of two 22-1/2-degree bends shall be required on 6" and larger water lines in cul-de-sacs and shall be shown as such on plans.

7. All water mains shall be placed in right-of-way areas or dedicated easements. All easements shall allow adequate area to construct and maintain the water line and appurtenances involved. Permanent easements shall be a minimum of 15 feet wide with line installed in center of easement. Permanent easements shall be provided as needed to serve adjacent property, even if the water line is not installed at that time. If the line has not been installed to future serve adjacent property, a larger easement than the minimum may be required to construct future line. Easement agreements shall be specific to state that no permanent structures may be constructed within the limits of permanent easements.

5. **Water Main Material**

Water mains shall be either ductile iron pipe (DIP), polyvinyl chloride (PVC), or galvanized pipe as outlined below. Any pipe, solder and flux used during installation of the water lines and services must be "lead-free" with not more than 8% lead in pipe and fittings, and not more than 0.2% lead in solders and flux.

DIP shall be centrifugally cast and shall conform to AWWA C150/ANSI A21.50 (latest version) for design and AWWA C151/ANSI A21.51 (latest version) for manufacture. PVC pipe 6 inch to 12 inch diameter shall conform to AWWA C900 (latest version). PVC pipe 14 inch to 36 inch diameter shall conform to AWWA C905 (latest version).

For water mains 6" through 16", DIP Pressure Class 350 shall be allowed. For water mains 18" through 24", DIP Pressure Class 300 shall be allowed. PVC C900 (most current date), Class 200, SDR-14 with cast iron equivalent O.D.s, gasket bell end with elastomeric gaskets shall be allowed for water mains 6" through 10" (solvent weld joints are not permitted). Galvanized pipe shall be seamless, American made, Schedule 80 and shall conform with the ASTM Specifications. Flanged DIP shall have threaded ductile iron flanges and shall conform to the requirements of AWWA C115 (latest version). All flanges shall be Ductile Iron Class 150, ANSI B16.5 (latest version). Flanges shall be flat faced and all joints shall use 1/8 inch black neoprene full-faced gaskets.

Ductile iron pipe and fittings shall have bituminous coating outside and shall be cement lined in accordance with AWWA C104/ANSI A21.4 (latest version). DIP shall have 1/16" cement mortar lining with rubber gasket push-on joints or mechanical joints. Mechanical joint glands shall be ductile iron. Tee bolts and nuts shall be Cor-Ten steel. Rubber gasket joints shall conform to AWWA C111/ANSI A21.11 (latest version), and shall be furnished by the pipe manufacturer with the pipe. A non-toxic vegetable soap lubricant shall be supplied with the pipe in sufficient quantities for installing the pipe. The lubricant shall be approved by NSF for use with potable water mains.

Pipe classes designated previously in this standard are minimum allowed. Actual pipe class shall be determined based upon the installation and the use intended. Pipe shall be appropriately labeled on the drawings. All PVC pipe for potable water service shall bear the approved stamp of the National Sanitation Foundation. Copper wire (12 gauge, bare single strand) shall be attached along the top of all buried PVC water lines, wrapped around service corporations and stubbed up into all valves boxes for locating purposes.

1. DIP shall be required in the following circumstances:

    1. Within 10 feet of sanitary and storm pipes.

    2. Within 15 feet of structures (near side of concrete footing), or top of bank of lakes/streams/creeks.

    3. Crossings over or under sewers, gas and storm pipes with less than 18 inches separation, with no joint allowed within 10 feet of crossing.

    4. Beneath all paved areas, excluding driveways or sidewalks.

    5. Within project boundaries of subdivisions with private roads where the Utilities Department will take over the line for operations and maintenance.

    6. Along all state right-of-ways.

2. The Utilities Director may mandate DIP in any instances of off-site or on-site construction where future abuse to the line is possible due to location or circumstances.

3. Restrained Joints shall be DIP as follows:

   For 12-inch and Smaller – Restrained joint shall be U.S. Pipe Field Lok, American Ductile Iron Pipe Lok-Fast, EBAA Iron Mega-Lug, or an equivalent product.

   For 14-inch Diameter and Larger – Restrained joint shall be U.S. Pipe TR Flex, American Ductile Iron Pipe Lok-Ring, or equivalent product.

   If inserting in older cast iron pipe, the restrained joint shall be as approved by the Augusta Utilities Department.

   Retainer Glands/Mega-Lug shall not be considered a fitting.

   The restraint method shall be suitable for the pipe size thickness and test pressure as required for the specified design case. The plans shall indicate the restrained length of pipe each side of the fittings.

4. Jack and Bore Installations:

Casing pipe used with jack and bore shall be in accordance with requirements of the Georgia Department of Transportation (GDOT) or railway specifications and Section 14C Excavation & Backfilling of these specifications. Carrier pipe shall be restrained joint DIP as outlined in paragraph 14.5.3.

Directional Bore Installations: Directional bores will be considered as a viable alternative to jack and bore installation under Augusta-Richmond County roadways. The Utilities Director will review each case for materials and construction methods.

5. Mains may be tapped as long as the tapping line is smaller than the tapped line unless otherwise approved by the Augusta Utilities Department. See Section 14.9 for service tap requirements. Equal size line connections approved by the Augusta Utilities Department shall require that a tee be cut into the main where possible. Tees are also required at locations dictated by the Utilities Director. Tapped connections in pipe and fittings shall be made in such a manner as to provide a watertight joint and adequate strength against pull-out.

   Tapping Sleeves and Valve shall be ductile iron, mechanical joint. Tapping sleeves and valves are required for all taps 4 inches and greater. Taps less than 4 inches shall be provided with a service saddle meeting the requirements of Section 14.9. Valves shall be provided on all taps. Tapping sleeves shall be a minimum of 6 feet from pipe joints.

6. Schedule 40 PVC shall only be used as sleeves for the installation of service line tubing under all pavement areas. Use in the water distribution system or other areas are not acceptable.

7. Unspecified transitions from DIP to PVC are not allowed. Material for transition shall be indicated and specified and must be approved by the

Augusta Utilities Department.

8. All construction material shall be first quality, not previously used. Repair clamps are not acceptable. Damaged or faulty pipe and materials must be properly replaced. All gaskets shall be new. When connecting to existing valves or fittings, gaskets shall be replaced, not reused.

9. The Engineer shall provide a complete set of shop drawings, which shall indicate the Augusta Utilities Department's specific material requirements. In general, material requirements will be guided by the latest versions of the specifications of AWWA, ANSI, ASTM, and NSF.

6. **Water Main Size**

The minimum size of water main shall be 6 inches unless otherwise approved by the Utilities Director. However, a professional engineer shall justify the size of the pipes with a hydraulic network analysis.

The new water main shall have the ability to meet maximum daily demands plus fire flow requirements as mandated by Georgia EPD "Minimum Standards for Public Water Systems" (latest version) and the Augusta Fire Marshal. The residual design pressure under all conditions shall not be less than 20 psi.

14.7 Valves, Fittings and Appurtenances

Valving of all water distribution systems shall be designed to facilitate the isolation of each section of pipeline between intersections of the network. Generally, the number of valves at an

intersection shall be one less than the number of pipes forming the intersection. Gate valves, 4 inches to 12 inches, shall be the resilient seat type conforming to AWWA C509 (latest version). Valves larger than 12 inches shall be gear operated butterfly valves, conforming to AWWA C504 (latest version). Wafer valves shall not be accepted. Valves shall generally be installed at intervals of not more than 2,000 LF on transmission mains and on all primary branches connected to these mains. Where possible, a valve shall be installed next to a fire hydrant for locating purposes. In high density areas (25 dwelling units), valves shall be installed as necessary to minimize the number of persons affected by a water main break.

The Utilities Director shall determine which mains are distribution or transmission.

Valves shall OPEN LEFT if installed south of Gordon Highway (SR 10), or OPEN RIGHT if installed north of Gordon Highway. Valves shall be provided with valve stem extensions to within 6 inches of ground surface, where centerline of pipe to grade is greater than 4 feet.

Valve boxes shall be M&H E-2702, Mueller H10364 or approved equal. Each valve box shall be slip-type to adjust for a minimum cover of 36" bury. The flanged base of the valve box shall be at least six (6) inches above the pipe so not to stress water lines 4" and smaller. Extension pieces will be required for additional depth over valves. Extensions shall be M&H E-3120 or Mueller H-10375. Covers shall have "WATER" cast on top.

All valves, bends, tees, crosses and dead ends shall be restrained by a mechanical restraint systems as outlined in Paragraph 14.5.3., or by use of a concrete thrust block in those instances that warrant such an installation. Thrust blocks shall be poured-in-place concrete having a minimum compressive strength of 3,000 psi after 28 days of cure time. Calculations for restrained joints shall be provided by the design engineer. Soil bearing value shall be 2,000 psf maximum. Lower values shall be used when soil is poor quality. All materials, fittings and appurtenances intended for use in pressure pipe systems shall be designed and constructed for a minimum working pressure of 150 psi unless the specific application dictates a higher working pressure requirement.

Standard pressure pipe fittings of size four (4) inch ID and larger shall be ductile iron

conforming to AWWA C153 (latest version), with mechanical joints unless flanged or restrained joints are required. Gray cast-iron fittings are not allowed. Ductile iron fittings shall be cement lined in accordance with AWWA C104 (latest version). Mechanical joint fittings, 24 inches and smaller shall be rated for 350 psi working pressure. Flanged joint fittings 24 inches and smaller shall be rated for 250 psi working pressure. All fittings 30 inches and larger shall be rated for 250 psi working pressure. For sizes less than four (4) inch ID, fittings shall be suitable to the pipe material and application. Glands for mechanical joint fittings shall be ductile iron, and tee bolts and nuts shall be Cor-Ten steel. Only bolt systems furnished by the manufacturer for mechanical joints are acceptable; nuts and bolts shall be new, not reused. Pipe gaskets shall be new as supplied by the pipe manufacturer. All flanges shall be ductile iron Class 150, ANSI B16.5. All flanges shall be flat faced. Full face, 1/8 inch black neoprene gaskets shall be used on all flanged joints. All joints shall conform to AWWA C111 (latest version). Bolts, nuts and washers for flanges shall be hot dip galvanized, except T-bolts shall be Cor-Ten steel.

List of Specifications:

ANSI/AWWA C151/A21.51-96 4-FEB-1996 or latest version
American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water

ANSI/AWWA C150/A21.50-96 1996 or latest version
American National Standard for Thickness Design of Ductile-Iron Pipe

ANSI/AWWA C115/A21.15-94 1994 or latest version
American National Standard for Flanged Ductile-Iron Pipe With Threaded Flanges

ANSI/AWWA C111/A21.11-95 1995 or latest version
American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

ANSI/AWWA C153-98 1998 or latest version
American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in. (75 mm through 1200 mm), for Water and Other Liquids

ANSI/AWWA C104/A21.4-95 1995 or latest version
American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water

14.8 Fire Hydrants

Fire hydrants shall be provided in all water mains, transmission and distribution systems. Accepted models are Mueller #A-24018, M&H Figure 29T AWWA Compression Type-Dry Top-Traffic Model 150 psi working pressure, 300 psi testing pressure. Kennedy K-81D will also be accepted. All fire hydrants shall be ordered safety yellow body with white bonnet and caps. Fire hydrants shall be spaced such that the radius of protection will not be more than 500 feet. In certain areas, closer spacing may be required by the Fire Marshal.

Each hydrant shall be left turn opening and capable of delivering a flow of at least 500 gallons per minute with a residual design pressure of not less than 20 psi, or a higher flow as required by the Fire Marshal. Multiple fire hydrants with looped mains and/or larger main sizes may be required to provide water for higher flow demand. Flow tests shall be performed to verify the specified fire flow demand.

Fire hydrants shall be of the dry barrel break-away type conforming to AWWA C502 (latest version), with two 2 ½ inches threaded hose nozzles and one 4 ½ inch threaded pumper nozzle. Hose and pumper nozzle threading shall be national standard. Show connection shall be 6-inch mechanical joint. The center line of the nozzles shall be 18 inches above the finish grade. Hydrants shall have a 5 ¼ inch interior valve opening and be restrained from hydrant to tee at the main. At the discretion of the Utilities Director, additional protection for fire hydrants shall be provided including but not limited to concrete filled ductile iron traffic posts.

Fire hydrant branches (from main to hydrant) shall be a minimum of 6 inches ID. Each branch shall be provided with a resilient seat gate valve located as close as possible to the main. Hydrants shall be located at or near road right-of-way lines with pumper nozzle pointing toward the road. A clear zone around all fire hydrants shall be adhered to, consisting of a 5 foot radius around the hydrant and 7 feet above the top of the hydrant. Maintain 15 feet minimum from hydrant to all structures. Placement of landscaping, fencing, etc. shall be considered in order to meet this clear zone requirement.

List of Specifications:

ANSI/AWWA C500-93 1993 or latest version
Metal-Seated Gate Valves for Water Supply Service (includes addendum C500a-95

ANSI/AWWA C502-94 1994 or latest version
Dry-Barrel Fire Hydrants (includes addendum C502a-95)

ANSI/AWWA C503-97 1997 or latest version
Wet-Barrel Fire Hydrants

ANSI/AWWA C504-94 1994 or latest version
Rubber-Sealed Butterfly Valves

ANSI/AWWA C507-99 1-DEC-1999 or latest version
Ball Valves 6 in. through 48 in. (150 mm through 1200 mm)

ANSI/AWWA C508-93 1993 or latest version
Swing-Check Valves for Waterworks Service, 2 in. (50mm) Through 24 in. (600mm) NPS (includes addendum C508a-93

ANSI/AWWA C509-94 1994 or latest version
Resilient-Seated Gate Valves for Water-Supply Service (includes addendum C509a-95)

ANSI/AWWA C550-90 1990 or latest version
Protective Epoxy Interior Coating for Valves and Hydrants

14.9 Water Service Lines and Taps

Tapping sleeves and tapping crosses shall be of a heavy body ductile iron, mechanical joint suitable for a working pressure of 150 psi for sleeves and crosses larger than 14-inch (200 psi for sleeves and crosses equal to or less than 14-inch), as approved by the Augusta Utilities Department.

No direct service taps shall be allowed. All service line taps shall be supplied with corporation stops. Service line tubing shall be rolled of soft continuous and seamless copper Type K conforming to AWWA C800 and ASTM B-88 (latest version).

Corporation Stops and Main Connectors:

¾" FB600 – 3 Ford or Equal

1" FB600 – 4 Ford or Equal

Taper Thread Inlet by Flare Copper Outlet

Eighth Bends:

¾" LA02 – 33 Flare 1/8 Bend

¾" LA04 – 33 Compression 1/8 Bend

1" LA02 – 44 Flare 1/8 Bend

1" LA04 – 44 Compression 1/8 Bend

Minimum size for residential use shall be one (1) inch. The service line shall be laid in a straight line and be of a continuous piece of pipe from corporation to curb cock. The curb cock shall be located 6 inches behind and 8 inches below the top of new curb or edge of asphalt. Where service connects to DIP or any pressure-rated pipe, service saddles must be used. Brass double strap tapping saddles shall be used. U-bolt type straps are not acceptable. All water service taps on the main shall be spaced at a minimum distance of 18 inches apart and a minimum of 18 inches from a bell or fitting. If two or more taps are required at a minimum spacing, they shall be offset 45º alternatively. Services greater than one (1) inch shall be seamless galvanized. 2" services shall have two 2" 90-degree galvanized elbows per Augusta Utilities' 2 Inch Water Service detail.

Services shall not exceed over 100 feet from the main to the meter. Where possible, meter shall be placed in unpaved area as close to the water main as possible.

14.10 Meter Installation

The Contractor/Developer shall furnish and install an approved meter box at the termination point of all water services, and maintain until such time as a meter is installed. Meters will be installed by Augusta Utilities Department at the time services is required at the stub-out. Each

unit within a residential building (i.e., duplex, triplex, etc.) shall have a separate meter, unless prior approval is received by the Utilities Director. The proper sizing of service lines is the responsibility of the design engineer. Meters will be available in the following sizes only: 5/8 x 3/4, 1, 1 ½, 2, 3, 4-inch, and larger standard sizes as necessary. Meter boxes for 1 ½ inch and smaller meters are standard. 2-inch and larger shall be installed in a meter vault. The Augusta Utilities Department reserves the right to request historical data for meter sizing.

Meter boxes shall be Rome type, 10" x 19" x 10" cast iron box and lid. The top shall have cast ribs on the bottom side with four (4) legs to prevent sliding movement. The box shall have a minimum weight of 37 lbs., for meters 1 ½ inch or smaller. Meter and curb stop shall be fully encased by the meter box. Meter vaults (for meters 2 inch and larger) shall be fabricated of masonry block or pre-cast reinforced concrete using 3,000 psi concrete and #4 rebar. The access hatch shall be made of heavy duty aluminum, and shall be hinged and lockable. The hatch shall be large enough for removal of the meter but no smaller than 48" x 36". Wall dimensions shall allow 2 feet of working clearance. Vault floors shall be no less than 4 inches thick with 3,000 psi concrete and #4 rebar, with the meter located no less than 18 inches off the floor.

The Augusta Utilities Department assumes no responsibility for undersized meters and problems associated with it. All meters will be provided and installed by the Augusta Utilities Department. The meters remain the property of the Augusta Utilities Department.

Meters should generally be placed 18 inches inside the adjacent utility easement that parallels the right-of-way. Where sidewalk, two feet of clearance is required between the customer’s side of the sidewalk edge and the meter box. In developments where the property line is not clearly defined (e.g., condominiums) the meter should be placed for ready access as approved by the Augusta Utilities Department. Meter and control valves shall be accessible and unobstructed for 4 feet in all directions. This shall include but not be limited to transformers, telephone junction boxes, walls, trees, etc. Meters shall not be placed in areas that can be fenced, such as backyard. Meter boxes shall not be placed in any asphalt or concrete surfaced areas (sidewalks, driveways, curbs, etc.) unless approved in writing by Augusta Utilities. For shopping centers, the developer’s engineer should give special consideration to meter layout so as to satisfy these requirements. When no alternative is available but to locate in asphalt, the top of box shall be flush with the asphalt surface. Meters shall not be located in low areas that normally receive storm water. The box shall also be located outside of parking stalls. The box and lid should be traffic bearing, but located outside of a commonly trafficked area.

14.11 Backflow Prevention Devices

Backflow prevention devices shall be provided, as required by the Utilities Director and as set forth in these Standards. All irrigation systems, water services and fire lines for industrial/office/commercial, schools, mobile home parks, multi-family residences and any other locations as determined by the Utilities Director shall require suitable backflow prevention assemblies on the customer side of service lines (domestic, irrigation, and fire). Backflow devices shall be tested by a certified person and the results furnished to the Augusta Utilities Department prior to any water use. Residential development shall install a "Dual Check" Backflow Device on the customer's side of service line at the point of tie-in to the water meter. The plumber or builder tying service into the set meter will submit the test results for the backflow prevention device to the Augusta Utilities Department's Inspector prior to acceptance and any water use.

Backflow prevention device assemblies shall be the latest approved product of a manufacturer regularly engaged in the production of this type equipment. All assemblies shall be as approved by the America Society of Sanitary Engineering (ASSE), The American National Standards Institute (ANSI), The American Water Works Association (AWWA), Foundation for Cross Connection Control and Hydraulic Research of the University of Southern California, and the Georgia State Plumbing Code.

Type and size of assemblies shall be indicated on the drawings.

Backflow prevention device ownership and maintenance responsibilities shall be as set forth in the appropriate ordinances. The Owner shall document yearly that the backflow prevention device has been tested annually by a qualified technician. A copy of the technician's certification must be attached to the test results and submitted to the Augusta Utilities Director. Engineer must comply with the Augusta Utilities Department Policies and Procedures for Backflow Prevention by Containment (latest version). A copy of this manual is available upon request.

List of Specifications:

ANSI/AWWA C510-97 1997 or latest version
Double Check Valve Backflow-Prevention Assembly

ANSI/AWWA C511-97 1997 or latest version
Reduced-Pressure Principle Backflow-Prevention Assembly

14.12 System Pressures

The design engineer shall not assume a pressure greater than 35 psi at the meter of detector check valve without confirmation from the Augusta Utilities Department. The design engineer, if possible, should field verify the available pressures prior to finalizing their design. The Augusta Utilities Department does not guarantee or warrant any pressure or flow above what the system can furnish. Augusta Utilities reserves the right to limit water usage for irrigation in the event of drought, or requirement by the Georgia EPD.

14.13 Fire Lines

All fire lines shall have a detector check valve with a 5/8 inch by-pass meter (to detect low flows) within the right-of-way or dedicated easement. No exceptions to the by-pass meter requirement shall be made regardless of sprinkler system type, configuration, etc.

CONSTRUCTION:

14.14 Water Distribution System Installation

Authorization must be obtained from the Augusta Utilities Department to construct, alter or modify a water line. Construction of water infrastructure will be authorized by the Utilities Department upon approval of submitted plans and notification of the Augusta Utilities Department at least 24 hours prior to starting construction (706-772-5503). Where water lines will encroach public right-of-way, a Right-of-Way Encroachment Permit approved by the Public Works Department is required prior to construction. A Right-of-Way Encroachment Permit application is available through the Public Works Department (706-821-1706).

Installation of water mains and associated appurtenances shall be in accordance with current AWWA specifications and manufacturer's requirements for the specific product. Loading or unloading and storage of pipe, fittings, valves, etc. shall be done such that to avoid damage. The interior of all pipe, fittings, valves, etc. shall be kept free of dirt and foreign matter at all times. All piping shall be placed in a dry trench with a stable bottom. Wet trench installation shall be allowed only upon written approval of the Utilities Director.

Mechanical restraint systems shall be required at each fitting involving a change of direction and as specified in the approved plans. Concrete thrust blocks will be allowed in lieu of mechanical restraint systems.

Backfill shall be free of boulders and debris, and shall comform to Georgia Department of Transportation Specifications. Sharp or rocky material encountered in the base shall be replaced with proper bedding. Pipe shall be laid on line and grade as designed. Pipe joints, gravity blocks, service connections, and conflicts shall be left exposed until visually inspected and approved by the Augusta Utilities Department's Inspector.

Fire hydrants shall be installed true and plumb with the center of the pumper nozzle facing

toward the road. Hydrants shall not be placed in the sidewalk. The engineer will be responsible for moving hydrants placed in sidewalks.

All valves shall be placed according to plans. Valve stems shall be installed plumb. Valve stem extensions are required as described in Section 14.7. Air relief valves shall be installed at all high points in the water main where air can collect, as shown on the plans or as directed by Augusta Utilities.

List of Specifications:

ANSI/AWWA C600-93 1993 or latest version
Installation of Ductile-Iron Water Mains and Their Appurtenances

ANSI/AWWA C605-94 30-JAN-1994 or latest version
Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water

ANSI/AWWA C512-92 1992 or latest version
Air Release, Air/Vacuum and Combination Air Valves for Water Works Service

14.14.1 Handling and Storing of Materials: Unload pipe so as to avoid deformation or other injury thereto. Place no pipe within pipe of a larger size. Store pipe and fittings on sills above storm drainage level and deliver for laying after the trench is excavated. Valves shall be drained and so stored as to protect them from freezing.

14.14.2 Pipe Laying (General): The interior of the pipe shall be clean and joint surfaces wiped clean and dry when the pipe is lowered into trench. Lower each pipe, fitting and valve into the trench carefully and lay true to line and without objectionable breaks in grade. The depth

of cover below finished grade shall be not less than 3 feet, or as shown on the drawings. Give all pipes a uniform bearing on the trench bottom. Allow no trench water or dirt to enter the pipe after laying. Insert a watertight plug in the open end of the piping when pipe laying is not in progress.

14.14.3 Boring and Jacking: Where required by the drawings, the water line will be installed in a steel casing, placed by boring and jacking. Where boring is required under highways or city/county roads, the materials and workmanship will be in accordance with the standards of the Georgia Department of Transportation or local authority. Boring and jacking under railroads will be governed by the latest A.R.E.A. Standards, Part 5, "Pipelines" and those of the railroad involved.

14.14.3.1 Casing Pipe: The casing pipe shall conform to the materials standard of ASTM Designation A252, with minimum wall thickness of 0.219 inch. Steel pipe will have a minimum yield strength of 35,000 psi. Casing pipe shall be joined together with welded joints.

14.14.3.2 Carrier Pipe: The carrier pipe shall be ductile iron as specified herein.

14.14.3.3 Installation: The steel casing shall be installed by the "Dry Bore and Jack" method. If voids develop or if the bored hole diameter is greater than the outside diameter of the pipe by more than approximately 1 inch, remedial measures will be taken as approved by the Engineer.

When installing water line through casing, Contractor shall use mechanical joint pipe with retained glands through length of casing. The water main shall be strapped to 8 foot long treated wooden skids

with metal straps throughout length of casing. The ends of the casing shall be sealed with brick and mortar.

14.14.4 Reaction Blocking: All plugs, caps, tees, bends and other fittings shall be provided with adequate reaction blocking as shown on the drawings. Reaction blocking shall be made to bear directly against the undisturbed trench wall. Where trench conditions are, in the opinion of the Engineer, unsuitable for reaction blocking, the Contractor shall provide tied joints to adequately anchor the piping as shown on the drawings. All the rods and clamps shall be given a bituminous protective coating.

14.14.5 Pressure and Leakage Testing: Before any work will be accepted for payment, the Contractor will fill the piping with water, open outlet as necessary for expelling the entrapped air. No fire hydrant shall be opened full force during charging operations. Thereafter, furnish the necessary equipment and test the piping under the supervision of the Engineer for a period of at least 2 hours at not less than 1.25 times the design pressure in pounds per square inch, based upon the highest elevation of the section under test. Pressure testing shall be in accordance with the latest AWWA Standard C600, Section 4.1. at 1.5 times the working pressure at the point of testing. Inspect all joints, and remedy to the satisfaction of the Engineer any defects discovered. Continue the test until all visible leaks have been eliminated from the part of the system under test, and the pressure remains constant with a maximum pressure drop of 5 psi for the duration of the test.

Immediately following the pressure test, and before any work will be accepted for payment, the Contractor shall perform a leakage test. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section thereof necessary to maintain the specified leakage test filled with water to within 5 psi of the test pressure. No pipe installation will be accepted until the leakage is less than the number of gallons per hour as determined by the formula:

L = Allowable leakage in gallons per hour.

S = The length of pipe in the section tested.

D = The nominal diameter of the pipe in inches.

P = The average test pressure during the leakage test in pounds per square inch gauge.

The leakage test shall be conducted in accordance with AWWA Standard C-600, Section 4.1 (latest version).

14.14.6 Connection to Existing System: All connections to existing mains shall be made under the direct supervision of the Augusta Utilities Department's Inspector. Valves on existing mains shall be operated by or under direct supervision of Augusta Utilities Department personnel. Tapping sleeves and valves shall be pressure tested prior to tapping. If service to existing customers must be cut off, the Augusta Utilities Department shall be notified at least three (3) days in advance to make necessary notifications. The Contractor shall disinfect and secure appropriate Utilities Department clearances and samples for any service interruptions which occur as a result of a Contract request for shut down or error. The clearances shall be obtained within 72 hours of reactivation.

If cut-off of service is required, the Contractor shall be ready to

proceed with as much material pre-assembled as possible at the site to minimize the length of service interruption. Augusta Utilities reserves the right to postpone service cut-off if, in the opinion of the Utilities Director, the Contractor is not ready to proceed on schedule. No customer should be without water for more than four (4) hours. The Owner/Developer shall arrange for temporary services to Customer if water will be shut off for more than four hours.

Local chlorination will be required for all pipe and fittings used to complete connections with the potable water system. Tapping sleeves and valves shall be chlorinated in accordance with AWWA requirements. All wet taps shall be witnessed by the Augusta Utilities Department's Inspector.

14.15 Cleaning and Flushing

Upon completion of installation, the mains shall be flushed and the water disposed of without creating a nuisance. Flushing must achieve a minimum water velocity of 2.5 fps in all portions of the pipe. The duration of the flushing will be determined by the Augusta Utilities Department's Inspector. If, in the opinion of the Augusta Utilities Department's Inspector, there is insufficient water available for proper flushing, the Contractor shall clean the lines by pigging. No flushing or cleaning shall take place without an Augusta Utilities representative present. The existing mains that the new mains are connected to may be required to be flushed under the direction of the Augusta Utilities Department when service is restored.

14.16 Testing and Disinfection

All water mains shall be leak tested. The Contractor/Developer shall provide all equipment,

materials and labor necessary for pressure and leak testing. This test must be observed by an Augusta Utilities Department representative and the design engineer. A pumping pressure of 200 psi must be supplied at the expense of the Contractor/Developer. The main tested shall either be isolated from active potable lines or protected from leakage by a double valve arrangement. All water used for pressure testing must be potable water with an adequate chlorine residual. Water lines shall be tested by valve sections. Maximum allowable leakage shall be as determined in accordance with current AWWA specifications. The standard duration of test is four (4) hours. Testing procedures shall meet or exceed AWWA C600 (latest version) requirements. Any portions of the main which fail the test shall be replaced or adjusted until the entire new main passes the test criteria. The pressure and leakage test shall be done concurrently.

Augusta Utilities shall be notified at least 24 hours in advance to schedule bacteriological testing of water mains. The Contractor shall replace or adjust components of the pipeline which fail the test. Clearance is required from the Utilities Department before the Augusta Utilities Department will allow the main to be put into service.

All piping complete with fittings and appurtenances shall be sterilized as specified in the applicable sections of AWWA Specification C651 (latest version) "Disinfecting Water Mains." Piping and appurtenances shall be thoroughly flushed then chlorinated with not less than fifty parts per million (50 ppm). Calcium hypochlorite can be used. Water from the existing distribution system or other source of supply should be controlled so as to flow slowly into the newly laid pipeline during the application of chlorine. The solution should be retained in the pipeline for not less than 24 hours and a chlorine residual of 10 ppm should be available at this time. The system shall then be flushed with potable water and the sampling program started. Sampling taps and chlorinated water used for disinfection shall be flushed to a location that will not damage property, persons, etc., and shall be provided by the Contractor/Developer at the expense of the Contractor/Developer. The provisions of this paragraph apply equally to new pipe and fittings and to existing pipelines into which connections have been made or which may have been otherwise disturbed to the extent that contamination may have occurred. All requirements of the health authorities shall be observed in executing this work. The disposal of heavily chlorinated water (following disinfection) must be accomplished in accordance with the latest editions of the AWWA Standard C651 and the EPD’s Minimum Standards for Public Water Systems.

Two or more successive sets of samples, taken at 24 hour intervals and tested by a State

approved private lab, shall indicate bacteriologically satisfactory water and the results submitted to the Engineer.

14.17 Water/Sewer Separation:

A 10 foot horizontal separation shall be maintained between water and sewer lines. Where the horizontal separation cannot be met or where water and sewer lines must cross, an 18 inch vertical separation, water over sewer must be maintained. Where the above conditions cannot be met, water and sewer lines shall be cast iron or ductile iron pipe with joints staggered such that maximum separation between joints exists. The water line shall be installed over the sewer line.

14.18 As-Built Drawings:

As the work progresses, record on one set of utility drawings all changes and deviations from the contract drawings in sizes, lines or grade. Record also the exact final location of water lines by offset distances to surface improvements such as edge of existing pavement or to property lines, etc. at a maximum interval of 200 feet. Make sufficient measurements to locate definitely all water lines etc., to permanent points. The drawings will show references to all valves, fittings, pipe brand changes, etc. Transfer accurately all such records in red pencil to white prints of the utility drawings and deliver them to the Engineer with monthly payment estimate.

14.19 Measurement and Payment:

Payment will be made only for elements in place and tested as follows:

1. Pipelines will be paid for at the unit contract price, per linear foot, for each

size, type and class installed, complete, including fittings. No deduction will be made for the laying length of valves and fittings installed within pipelines.

2. Valves will be paid for at the unit contract price for each size and type installed. Payment therefore will include box or vault as shown on the plans.

3. Fire hydrants will be paid for at the unit contract price for each size installed, complete with the lead piping, valve, and main tee, in place as shown on the plans.

4. Service lines will be paid for at the unit contract price for each size and type installed, complete as shown on the plans.